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THE AMERICAN JOURNAL
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OPHTHALMOLOGY

VOL. XXXIV. JULY, 1917. No. 7

ORIGINAL ARTICLES.

POST-CILIARY SCLERAL TREPHINING FOR GLAUCOMA.

By A. E. Ewing, M.D.,
ST. LOUIS, MO.

This operation suggested itself to me for an advanced glaucoma of the right eye in the case of an elderly lady, 75 years, with whom the Elliot trephining for the fellow eye had gone badly, the wound having become necrotic after ten days, although the result at first promised to be favorable. At the time of this trephining of the left eye, now a year ago, the right eye was practically blind from a glaucomatous process of some years standing, the vision being 1/96, the globe hard, T: 50, Schiötz, the pupil wide, the lens somewhat clouded, the field too uncertain for a diagram to be obtained and there was an old central nebula of the cornea. However, as the eye was quiet, it was thought best to depend on miotics rather than take any further risk.

During the last four months this right eye had become threatening, being most of the time irritable, sometimes painful, and the typical glaucoma-cyclitic ciliary injection had developed. In addition to this the eye had become blind. The post-ciliary trephining was chosen as being the safest procedure for this eye on the following grounds:

(1) In eyes that have been enucleated because of advanced glaucoma and fixed for pathological investigation, the sections nearly always show a space between the sclera and the choroid in the region of the ora serrata.

(2) In glaucomatous eyes with scleral ectasia the distension is usually in the region of the ora serrata, or just anterior to it.

(3) Birnbacher and Czermack (*Graefe's Archiv fuer Ophthalmologie,* V. xxxii, 2, p. 1-146, 1886), and Mattice (*Archives of Ophthalmology,* V. 42, p. 612) have demonstrated that in the incipiency of the scleral staphyloma, or ectasia, there is a space between the sclera and the choroid, the choroid being normally continuous and the sclera elevated.

(4) In non-perforating injuries to the globe, accompanied by rupture of the choroid, the choroid heals and makes no future trouble.

(5) In cases where bits of steel have been removed from the vitreous through the sclera, posterior to the ciliary muscle, the globe has become soft following the puncture, and the wounds have healed kindly and permanently.

(6) In eyes trephined for retinal detachment the eyes have healed, apparently without damage to the choroid or the retina; and the trephine openings, months afterward, have given no evidence of occlusion by scar tissue, being readily visible through the overlying conjunctiva.

(7) The operation can be performed with practically no pressure on the globe that might provoke deep hæmorrhage.

(8) The scleral wound can be fully protected with a conjunctival flap.

(9) Many eminent ophthalmic surgeons stab the sclera posterior to the ciliary region in operating for glaucoma, with the purpose of reducing the tension, before proceeding with the iridectomy.

On investigating the literature with regard to the subject, I found that the operation had been successful in the hands of Argyll Robertson, who first introduced it in 1875 (*Royal London Ophthalmic Hospital Report,* Vol. viii, p. 404), and with Froehlich in 1903 (*Klin. Monatsblaetter f. Augenheilkunde,* Vol. 42, 1, p. 411, 1904). Puncture of the vitreous was introduced by Mackenzie in 1830. (*Parsons, Pathology of the Eye,* Vol. iii, p. 1071).

For the operation Argyll Robertson employed a 2 mm. trephine and located the wound in the vertical meridian, 4 mm. from the upper corneal margin in three of the four cases that he reports. In his first case there was a scleral ectasia 8 mm. in diameter opposite the upper margin of the cornea, which projected so as to materially interfere with the movements of the lids. In this eye he located the wound in the region of greatest protrusion. The immediate result was satisfactory, but a cyclitis developed three

months later and the eye was enucleated as an expedient of safety for the fellow eye. His second operation was also satisfactory at first, but tension developed later, which was relieved by puncturing the scleral bleb. After this, tension again developed, and the scleral bleb was punctured the second time. With a third development of tension a neoplasm was suspected, the eye was removed and a neoplasm was found. In both of these cases he trephined directly through the conjunctiva. In the other two he trephined beneath a conjunctival flap. Both were successful. There was loss of vitreous in the first three; he does not state as to the last.

Froehlich selected the region between the inferior and external recti muscles, employed a 5 mm. v. Hipple trephine, armed with a 1 mm. shoulder, raised a 10-12 mm. flap, beginning near the cornea, and located the trephine wound posterior to the ciliary muscle. He then closed the conjunctival wound with a suture. He lost vitreous in the five cases that he reports, and the last one, in which he used a 2 mm. trephine, suffered with a deep hæmorrhage, on account of which the eye was eviscerated. The other four became quiet and the results were satisfactory. All were stone-hard, severely painful glaucomatous eyes.

The two operations that I have now performed are not sufficiently old for a final conclusion, although partially successful. In both cases a 2 mm. Elliot trephine was employed, the wounds were located in the neutral region between the superior and the external recti muscles beneath 8 mm. conjunctival flaps raised from below, the first wound being placed 7 mm. from the corneal margin and the last 9 mm. In the first case the conjunctiva was not sutured, in the second a suture was placed at the apex of the flap. As there was no pain, and the operations were not urgent for this reason, agar-agar cultures were taken with each case as a precaution against infection; the conjunctiva was also irrigated once daily with a normal saline solution during this period. For half an hour previous to each operation a 1 per cent. holocain solution was instilled into the conjunctival sac every ten minutes. Ten minutes before making the conjunctival incision a 10 per cent. cocain solution was used. Three minutes before beginning a minim of 1 per cent. cocain solution was injected beneath the conjunctiva at the site selected for the trephine wound, and the 10 per cent. solution to the conjunctiva was repeated. The trephine was placed well beneath the retracted

conjunctival flap (Figure 1), and the manipulation was that recommended by Elliott, in which he leaves a thin bridge at one side of the piece to be removed, and later divides this with scissors. In each case this procedure left a perfectly round opening, with loss of less than a half a minim of vitreous in the first case, and no breaking of the choroid in the second case. Immediately following the operation in the first case, in which there was a loss of vitreous, the tension became subnormal; in the second case, in which there was no loss of vitreous, there was very little if any change in the tension. There was no pain during either operation, and very little discomfort afterward.

The first case was redressed daily and cleansed with a normal saline solution. At the first dressing there was a trace of blood in the lower nasal portion of the anterior chamber, but the cycli-

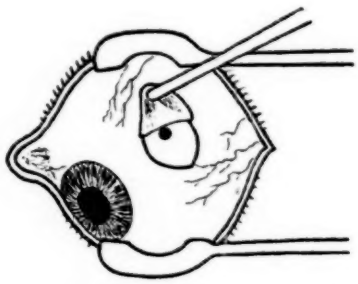


Figure 1. Post-ciliary scleral trephining for glaucoma. The drawing indicates the location of the wound in the neutral region, midway between the superior and the external recti muscles.

tic injection had disappeared, and the tension was about normal. Within the following three days the blood disappeared from the anterior chamber, and the pupil, which was very wide, contracted moderately, but sufficiently to reveal several small adhesions of the pupillary margin to the lens. For about three weeks there was moderate conjunctival injection and considerable watering, with some protrusion of the conjunctiva at the site of the trephine wound, and sufficient swelling to obscure the opening in the sclera. Now, six weeks since the operation, this protrusion persists slightly, but the trephine opening is visible by focal light, and the globe is quiet and comfortable, T. 45 Schiötz. The treatment has consisted of cleansing the conjunctival sac once daily with a normal saline solution during the first week. Since then a borax and boric acid 2 per cent. solution has been

employed. During the first three weeks she preferred to wear the bandage because of the watery discharge.

The success in the first case, and the reasons in favor of the operation mentioned above led me to suggest it to a middle aged gentleman, 47 years, whose mother became blind in both eyes from glaucoma. This is the patient referred to above as the second case. For nearly a year he had been troubled with a "full feeling," and occasional pains and blurring of the vision in the left eye. Thirty years ago he received an injury to the right side of his head by falling on a beam, but does not remember noticing anything wrong with the right eye afterward. At the time of the consultation, April 10, 1917, there was a scotoma in the upper portion of the field of the right eye, which was otherwise normal, and the ophthalmoscope showed an atrophic retino-choroidal area in the lower portion of the fundus corresponding to this scotoma, which has the appearance of having been a choroidal rupture. O.D. V=20/15; T. 19, Schiötz.

O.S. V=20/15; T. 45, Schiötz; media and fundus normal with the exception of a positive glaucomatous cupping, measuring 2D. in depth at the disc margin to the temporal side; pupil a little larger than pupil O.D.; contracted to 1 mm. with pilocarpin 1/120; each pupil readily responsive to light; field slightly contracted to the nasal side and containing a nearly central scotoma.

An examination of the nose was made by Dr. Sluder, who reported a "hyperplastic post-ethmoidal sphenoiditis R. and L. Considerable thickening and inflammation. Also a sphenoidal empyema R. I was unable to find any pus L., but from wide experience with these cases I feel reasonably sure it existed L., too. The discharge is very scant and may easily enter at a point not to be seen by any means now at our disposal. I have proven this on the cadaver."

May 12th.—No improvement from use of pilocarpin or from nasal treatment. O.S. T. 45, Schiötz: globe entirely quiet, V= 20/15; apparently nothing wrong with the eye. Post-ciliary scleral trephining. Immediately following the operation there was no gush of fluid, no protrusion of the conjunctival flap after it had been sutured in place, and through the flap the dark trephine opening could be readily outlined. Also, there was no apparent reduction in the tension as estimated by palpation with the fingers. The bandage was removed three days later. There was no conjunctival irritation except along the margin of the conjunctival incision, and the scleral wound was plainly visible.

May 16th.—O.S. V=20/15; T. 36, Schiötz. The ophthalmoscope showed a whitish area in the choroid at the trephine wound, and in the lower nasal portion of the field there was a corresponding restriction; media clear; pupil possibly a little smaller than at the time of the operation.

May 19th.—Slight elevation of conjunctiva in the region of the scleral wound, no tenderness on pressure.

May 25th.—O.S. V=20/15; T. 35, Schiötz. Globe quiet, media clear. Patient says that the "full feeling" is gone, that the blurring is less and that the eye is more comfortable in every respect.

My success with these two cases in addition to the successes obtained by Argyll Robertson and by Froehlich, indicates that the operation is a safe one to employ in all forms of glaucoma. As the loss of vision in glaucoma is due to the pressure, which causes the weakest point in the sclera to yield, it stands to reason that if we can obtain other still weaker points, that the yielding will be at these points, and my experience indicates that there is no harm in producing several such openings in the sclera. If, in addition to this, we can obtain drainage into the conjunctiva, as was very apparent in the first case above described, and has apparently developed later in the second case, the operation may prove to be desirable. Moreover, any loss in the field that may occur from one or several operations because of choroidal trauma, would be peripheral and of little consequence. As this loss in the field is usually in the nasal portion, the location of the trephine wound in the temporal portion of the sclera and the accompanying choroiditis could have no other effect than would follow in the ordinary course of the glaucoma. From the standpoint of the ideal, the operations are not wholly successful, because the tension in neither of the eyes is normal. From the practical standpoint the condition in the advanced glaucomatous eye is entirely satisfactory, the globe having become quiet, and the pain having been relieved. The tension in the second case is reduced about one-third. This is a material gain. As no scar tissue is evident in the scleral wound, better drainage may develop as the present visible swelling in the choroid subsides.

The objections to this operation are, insufficient drainage, and liability to choroiditis, which may be succeeded by a general uveitis. The latter objection I have answered above. The first is yet to be decided, although I have proved in the second case above mentioned that there is no immediate drainage and prac-

tically no change in the tension unless the vitreous is punctured, yet some form of drainage must have been established, as the tension in this eye later became lowered without the aid of any miotic. While the puncturing of the vitreous is not desirable for, fear of deep hæmorrhage, it may also prove harmless in the majority of cases, as is shown in the removal of foreign bodies.

Other points yet to be decided, are the diameter of the trephine to be employed, and the most favorable distance from the clear corneal margin to locate the scleral wound. In one of the cases mentioned above the posterior rim of the trephine wound was 8 mm. from the corneal margin; in the other case it was 10 mm. The fibres of the ciliary muscle extend backward about 4.5 mm. from the clear margin of the cornea, and the distance to the ora serrata is 7 mm. The wound, with the center of the trephine opening at 9 mm., caused a restriction in the field. On account of this restriction in the field it may be best to locate the center of the wound at 6 mm., or the site that Froehlich selected may prove to be advisable, for the reason that the restriction would be above the horizontal meridian instead of below it, and this may cause less disturbance. It would still be in the neutral region, or the region in which there would be no traction on the wound in the movements of the globe. My chief reasons for selecting the region above the horizontal meridian were, that the wound is covered by the upper lid somewhat more thoroughly, and there is a possibility that there is less liability to infection beneath the upper than beneath the lower lid. However, against this last reason we have the experience in removing foreign bodies from the vitreous, the incision for which is usually made in the region between the external and inferior recti muscles, and the wounds heal readily and permanently.

The field in the second case is also of interest. The different dates at which it was taken show the effect of glaucomatous compression on the axis cylinders in the temporal portion of the retina, how they choke at one time, and recover at another with the release of the tension as indicated by scotomata. There was a small, nearly central scotoma which still persists now weeks after the operation. This may arise from the nasal complication. Otherwise the field, which was nearly normal, is about the same as before the operation. Even the restriction caused by the choroidal disturbance due to the operation has practically disappeared. The variation in the field at different dates are shown in Figure 2.

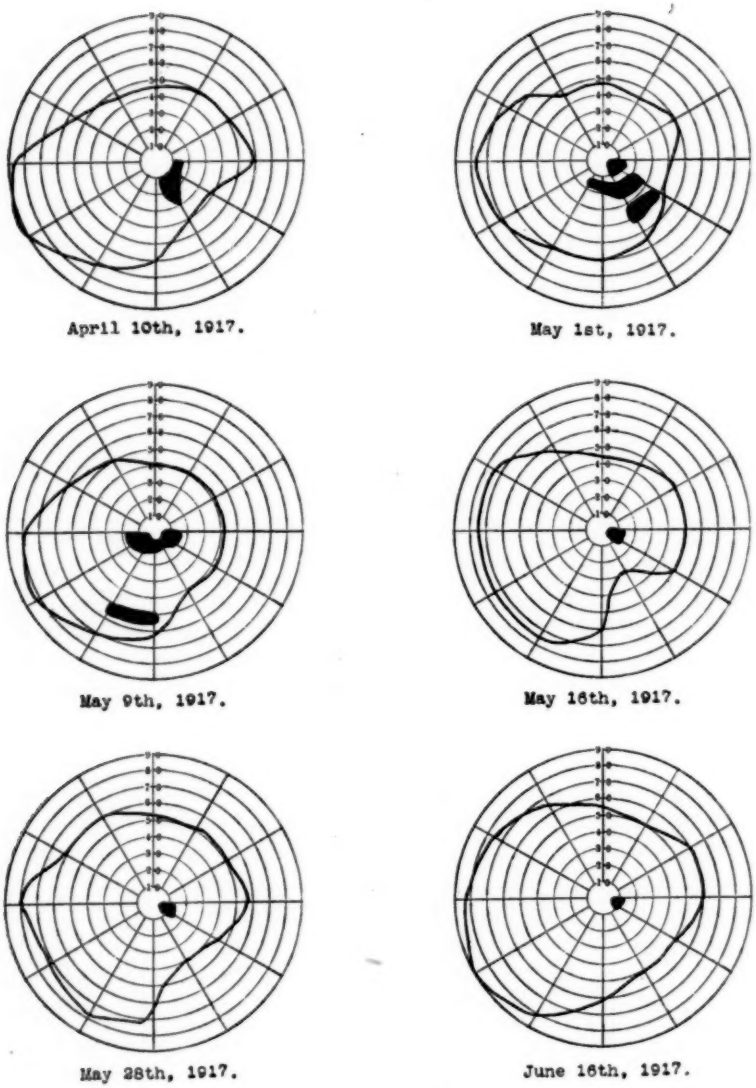


Figure 2. Post-ci iary scleral trephining for glaucoma. In this figure the changes in the field of the second case are indicated, previous to and succeeding the trephining.

If the operation can be proved to be ordinarily successful, it will be especially adapted for incipient and advanced glaucoma simplex, hæmorrhagic glaucoma, juvenile glaucoma and for glaucoma in aphakial eyes.

NOTE.—This paper was prepared for the meeting of the American Ophthalmological Society, May 29th and 30th, 1917, but it was not presented because of the illness of the author. During the six weeks that have since elapsed, the improvement in the second case has been maintained. With the aid of a 2 per cent. pilocarpin solution, one drop at bedtime, the tension has been reduced to 22, Schiötz, the field has become almost normal (Figure 2, June 16th), the central scotoma is smaller and there is less cupping of the disc.

In the first case the eye has remained quiet and comfortable, there is a very slight non-irritated elevation of the conjunctiva over the trephine opening and the tension is 37, Schiötz, without the aid of miotics.

Also, during this interval, the same procedure has been employed in three other cases, without rupture of the choroid, one, a glaucoma simplex with normal vision, but a greatly restricted field, and two practically blind aphakial eyes, all with equally good results in the matter of the lack of pain following the operation, and positive reduction in tension in the one with vision, the tension preceding the trephining having been 47, Schiötz, and ten days after the trephining it was 25, Schiötz. The field and the cupping of the disk, which was 3D., was unchanged. This was to be expected, as the eye had been under treatment for glaucoma for a year. In one of the aphakial eyes the tension was 50, Schiötz, preceding the trephining; three weeks after the trephining it was still the same, yet the globe had become quiet and comfortable, and the vitreous, which was so clouded that no details of the fundus could be seen, had cleared so that the disc and larger vessel could be outlined. In the other aphakial eye the tension was 32, Schiötz, taken over a staphylomatous cornea; two weeks following the trephining it was 40, Schiötz. As this was a staphylomatous cornea, and as the Schiötz tonometer requires the normal cornea for its proper action, it is probable that very little importance may be attached to these measurements. Of greater importance is the fact that there was considerable coagulated blood in the very shallow anterior chamber previous to the trephining and little tendency to its absorption; this blood disappeared rapidly after the trephining and the general condition of the globe improved.

The behavior of the last three cases, in all of which there was no choroidal rupture, strengthens the conclusion arrived at from the second case, which is, that a drainage is established between

the supra-choroidal space and the sub-conjunctival space by means of the trephine wound. This drainage is of value for all forms of glaucoma, but because of the protection afforded by the choroid, it is especially valuable for aphakial eyes, in which vitreous is liable to plug the sclero-corneal wound following other procedures, for eyes suffering from hæmorrhagic glaucoma, and for eyes with tense absolute glaucoma, as both of these last mentioned are liable to deep hæmorrhage from the sudden decrease in tension in sclero-corneal operations.

The points in favor of the operation are:

1. The ease and lack of trauma with which it may be performed.
2. The slow drainage and protection by the choroid against sudden deep hæmorrhage.
3. No deformity to the pupil.
4. No deformity to the sclero-corneal margin.
5. Little risk of injury to the lens.
6. Complete protection of the wound by the eyelid against future necrosis or infection.
7. Positive thinning of the sclera to act as a protective expansion drum in future glaucomatous exacerbations.
8. Repetition elsewhere in the globe if necessary.

ON LEUKÆMIC NEWFORMATION IN THE RETINA.

By Dr. Y. Koyanagi,
SENDAI, JAPAN.

In leukæmia we often find accumulations of leukocytes in the retina. They appear as white spots with or without a red rim. Sometimes there is even a tumor-like swelling (cases of Becker,[2] Friedlaender,[3] Kerschbaumer,[10] Baeck,[1] Feilchenfeld,[5] Orlow,[18] and others). The question whether true leukæmic newformations occur in the retina is, however, still open.

As is known, Virchow,[21] in his lectures on pathological newformations, said that it is possible that leukæmic tumors may appear in the retina. Leber[13] at first was inclined to the same opinion since he thought that he was right in his case in looking upon the accumulations of leukocytes as true neoplasms. On account of the unsatisfactory explanation for the hæmorrhagic area surrounding the leukocytic spot, he later on changed his opinion, and assumed a diapedesis in which at first more red blood cells and later on more or only white blood cells would emigrate.

According to Baeck's[1] opinion, an extravasation rich in leukocytes forms the basis for the lymphomatous newformation in the retina, which probably acts as a point of attraction for the leukocytes which later on leave the bloodvessels—the so-called leukotactic action of leukocytes. By this continuous cell-apposition a tumor-like accumulation results from the original focus.

Feilchenfeld,[5] who also assumed a diapedesis, in order to explain the origin of such a roundish tumor-like focus, laid particular stress on the decided tendency of leukocytes to conglomerate.

Murakami,[17] based on the alterations of the retinal bloodvessels, which he studied in a case of splenic leukæmia, had stated it to be his opinion that such a tumor-like leukocytic focus must be looked upon as a special form of varicosity of the bloodvessels. This latter was covered by the numerous leukocytes, and a few erythrocytes emigrated from it to such an extent that the vessel wall could hardly be recognized. He thinks, this might be an easier way to explain the genesis of the tumor-like leukocytic foci.

In Orlow's[18] case the bloodvessels at the site of the tumor-like leukocytic focus were aneurismatically enlarged, and their walls were infiltrated with leukocytes to such an extent that their

structure was lost. A circle of erythrocytes was found only where some small remnants of bloodvessel walls were still noticeable.

Ginsberg,[7] in his book, said that the leukæmic newformation in the retina is due to extravasation of the greatly altered contents of the bloodvessels by diapedesis or rhexis accompanied by an increase in leukocytes.

Without doubt most authors consider the leukocytic accumulation in the retina as due to an extravasation rich in leukocytes.

Meller,[16] on the contrary, insists strongly that a true lymphomatous newformation may appear primarily in the retina, as well as in the choroid and in other parts of the body. As good examples for this he points to the cases of Kerschbaumer.[10] He furthermore considers the alterations in the retina in the cases of Friedlaender[6] and Feilchenfeld[5] as true leukæmic newformations.

I have stated recently in a paper "On the leukocytic infiltration in the choroid in leukæmia," that I, too, agree with Meller's[16] opinion. In confirmation of our assumption I should like to report here the following case of leukæmic newformations in the retina:

History.—R. Ootoshi, boatman, 24 years of age, developed in the middle of December, 1912, without any known cause, four glandular swellings the size of a thumb in the right subinguinal region. Because these tumors showed a tendency to continued growth, the patient was taken to the surgical clinic of Professor H. Ito at the University of Kioto. On account of the diagnosis of "leukæmic simple regional lymphomata" the internal treatment by the exhibition of arsenic combined with local Roentgen ray irradiations was continued. This was very successful.

On August 3rd the patient left the hospital almost totally cured. At the beginning of October of the same year he returned, again complaining of a painful glandular swelling in the previously affected subinguinal region which, he said, had spontaneously ruptured a few days ago. On October 11th he was again admitted to the hospital.

Status praesens.—The patient is of medium height, with a strong bony structure; dry, dirty appearance of the skin and anæmia of the visible mucous membranes. The pulse is regular, tension moderately good. Several throat, submental and neck-glands are swollen to the size of a pea or bean, elastically soft, not painful on pressure and easily movable. The outlines of the

heart's dullness are normal; the sounds at all the ostia are pure. The lungs show nothing abnormal either by auscultation or percussion. The liver, spleen and kidneys cannot be felt. At the place corresponding to the insertion of the mesentery several hard swollen glands of pea or bean size can be palpated. Some of the axillary, cubital and inguinal glands on the left side are also swollen to the size of peas or beans. In the right subinguinal region a glandular swelling is seen of the size of a hen's egg; it is painful on pressure and fluctuating. Neither albumen nor sugar is found in the urine.

Clinical course.—November 1, 1913, the sternum and the medial condylus of the tibia are painful on percussion.

November 13th.—The frontal bone is slightly swollen along the linea temporalis and painful on percussion. The color of the skin is very pale. The patient complains of tinnitus and headache.

November 25th.—The elastic soft spleen can be felt to the breadth of a finger below the margin of the left costal arch. Anæmic systolic noises are easily heard at the heart.

November 27th.—The face is œdematous and swollen. The glands of the right inguinal region are growing more numerous and larger. The thickening of the frontal bone is becoming more noticeable. There are at times disturbances of sensitiveness in the neighborhood of the mouth.

December 3rd.—The patient complains of loss of appetite and hearing. The liver is slightly enlarged.

December 17th.—The general condition is continually getting worse. Albumen in urine. Ten days later no albumen. Towards the end of December the glandular swelling at the right side of the neck grows visibly larger. Spleen and liver are slightly smaller. The thickening of the bones in the frontal region grows less noticeable. The sternum, however, is slightly thickened.

At the beginning of January, 1914, the whole body is œdematous and swollen. In the middle of February all of the palpable swollen lymph glands show a tendency to become smaller.

March 6th, 1914.—Exitus letalis.

The repeated blood examinations gave the following results:

Hæmoglobin on November 14th, 30 per cent.; on January 13th, 15 per cent.; on February 26th, 11 per cent.

Erythrocytes: November 4th, 1028000; January 13th, 826000; February 13th, 823000.

Leukocytes: November 4, 235200; January 13th, 99200; February 13th, 55200.

Proportion between white and red: November 4th, 1:4.37; January 13th, 1:8.3; February 13th, 1:14.9.

PERCENTAGE. OF THE LEUKOCYTES AMONG THEMSELVES.

Small lymphocytes: November 4th, 6.01 per cent.; January 13th, 70.73 per cent.; February 13th, 83.41 per cent.

Medium sized lymphocytes: November 4th, 87.74 per cent.; January 13th, 13.92 per cent.; February 13th, 11.51 per cent.

Large lymphocytes: November 4th, 0.96 per cent.; January 13th, 0; February 13th, 0.

Large mononuclear leukocytes: November 4th, 0; January 13th, 0.24 per cent.; February 13th, 0.1 per cent.

Neutral polyn. leukocytes, November 4th, 3.84 per cent.; January 13th, 12.69 per cent.; February 13th, 4.22 per cent.

Eosin. leukocytes: November 4th, 0.72 per cent.; January 13th, 0.97 per cent; February 13th, 0.19 per cent.

Mastcells: November 4th, 0.24 per cent.; January 13th, 0.24 per cent.; February 13th, 0.1 per cent.

Myelocytes: November 4th, 0.49 per cent.; January 13th, 1.21 per cent.; February 13th, 0.47 per cent.

The clinical as well as the pathological diagnosis was: chronic lymphatic leukæmia.

OPHTHALMOSCOPIC FINDINGS.

On July 13th, 1913, the eyes were for the first time examined ophthalmoscopically. Nothing abnormal was found. V=6/5, not improved with glasses.

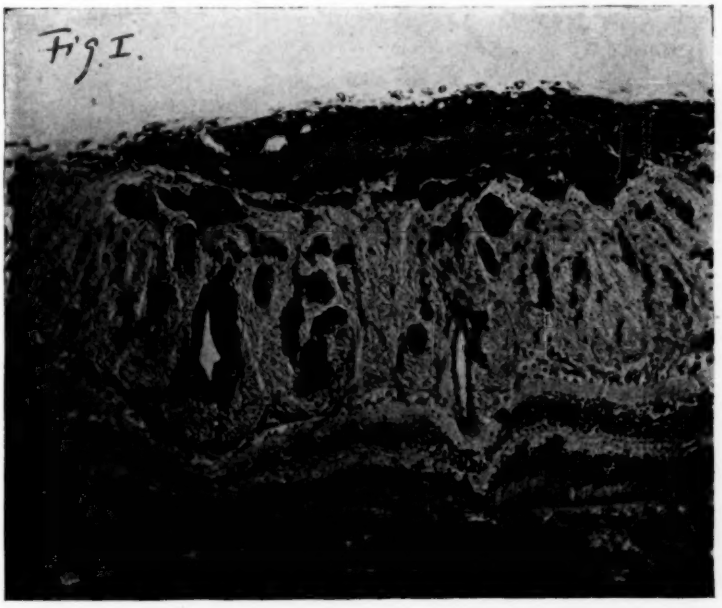
On October 14th, 1913, the patient complains of dim vision of the R.E.; L.E. normal. V=6/5 as before. Externally the right eye looks normal. Media clear. The color of the fundus is normal. In the region of the macula and up- and outward from the papilla there are several small retinal hæmorrhages. No white spots with or without red rims are seen. V=6/36; not improved with glasses.

After this I had, unfortunately, no more chance to examine the patient ophthalmoscopically before he died. I must state, however, that beginning with November 13th the patient's vision grew very considerably worse.

MICROSCOPICAL EXAMINATION.

The two bulbi hardened in Zenker's fluid were after the usual preliminary treatment embedded in celloidin and cut into series of horizontal sections. The L.E.: The retina shows directly above the papilla a circumscribed tumor-like swelling; an ac-

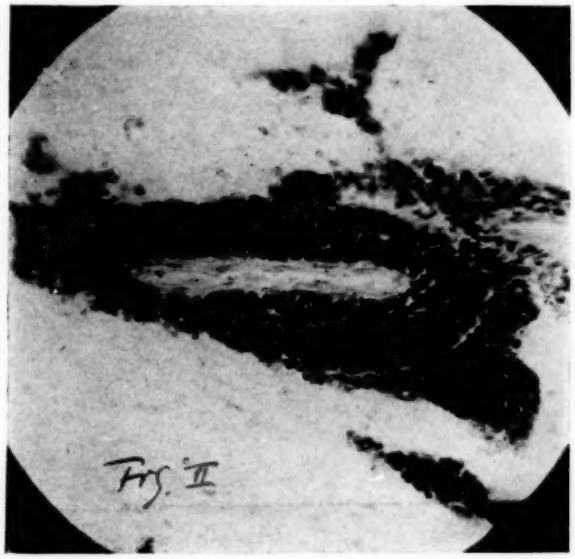
cumulation of medium sized lymphocytes with which not a trace of red blood cells is mixed. The accumulation lies mainly in the nerve fibre layer and is slightly protruding towards the vitreous body. The bloodvessels traversing this focus are not dilated and mostly empty; their walls, especially the endothelial cells, show no pathological changes. There is absolutely no outlining of the focus by red blood cells. In its periphery little lymphocytic conglomerates are encountered which in almost every instance surround the undilated bloodvessels. There is, furthermore, a very similar but much larger accumulation of medium-



sized lymphocytes in the macular region; in its central part there is a hæmorrhage. Hypertrophic varicosities of nerve fibres, glia hypertrophy and small perivascular lymphocytic aggregations are also found here and there. Small hæmorrhages with very few leukocytes are disseminated almost through the whole retina, and even in some places in the subretinal space. The central blood vessels on the papilla, too, are surrounded mantle-like by lymphocytes, while behind the lamina cribrosa not a trace of these lymphocytic aggregations can be found. The choroid, also, shows in its posterior part a moderate extravascular infiltration

with medium-sized lymphocytes. Its bloodvessels are not dilated and mostly empty. Numerous vesicles of varying sizes are found on the ciliary body. Their walls are formed by flattened epithelial cells. These vesicles contain very little of a coagulated material. The optic nerve is free from pathological changes. Iris and cornea, too, appear normal. There are slight lymphocytic accumulations in the episcleral and orbital tissue which in the main surround the bloodvessels.

The R.E. shows in general the same alterations, but the accumulation of lymphocytes in the retina is much smaller and ap-



pears in single patches and never in a tumor-like swelling. The lymphocytic accumulation in the choroid, however, is much more pronounced, so that in the most posterior and thickest part it is about three times as thick as in the norm. In the infiltration here and there a small hæmorrhage is found. The bloodvessels are not dilated and show nothing pathological. On the ciliary body the same vesicles are found as in the right eye. Iris and cornea and the optic nerve are unaltered.

That in this case we had to deal with one of chronic lymphatic leukæmia, there can hardly be any doubt. At the beginning of the disease the blood contained principally medium sized lympho-

cytes (58 to 88 per cent. of white blood cells); later on, especially shortly before death, small lymphocytes take the upper hand (83 per cent.).

Concerning the pathological changes in the retina, we must consider first that the medium sized lymphocytes intermixed with not a trace of red blood cells formed a tumor-like accumulation just above the papilla. The surrounding of the foci with red blood cells which we find often in leukæmic retinitis (Liebreich) is altogether absent. The bloodvessels traversing the focus show absolutely normal conditions. For the small lymphocytic accumulations near the focus the undilated bloodvessels almost always form the base. The varicose, rather aneurismatic, dilatation of the bloodvessels is found nowhere. Their walls, especially their endothelia, nowhere show pathological changes. It is to be noted, furthermore, that here we have an accumulation of medium-sized lymphocytes, while the small ones predominate in the circulating blood. It is evident from this that in this case the leukocytic aggregation cannot be looked upon as the result of a varicose dilatation of the bloodvessels, filled to their utmost with blood, nor as produced by an extravasation rich in lymphocytes. In such a case it is easy to exclude the possibility that lymphocytes, having originated in any tissue, may by way of the perivascular lymph sheaths wander into another locality (for instance, the retina), and there congregate in a tumor-like swelling, since not a trace of perivascular lymphocytic accumulation can be found behind the lamina cribrosa. That lymphocytic accumulations which surround the bloodvessels mantle-like can autochthonically originate locally in lymphatic leukæmia is today accepted by most authors; as, also, that the lymphocytes have their origin with the greatest probability in the adventitia (perivascular genesis of lymphomata).

The vessels of the retina, especially the veins and capillaries, are surrounded by adventitial sheaths between which and the blood vessel there is a lymph space (Leber). In consequence I am probably justified in my case to assume that the lymphocytes grew exclusively at the place where they congregated and perivascularly. The accumulation of lymphocytes in the macular region of the left eye seems to demand another explanation of its manner of origin, since it contains in its central part a hæmorrhage. In this place, however, the bloodvessels are not dilated and mostly empty. A varicose or aneurismatic enlargement can nowhere be found. In my opinion, therefore, this lymphocytic

congregation is due to perivascular hyperplasia. The additional hæmorrhage, which in leukæmia is the most frequent alteration found in the retina, must here be considered as an accidental combination (by diapedesis), or rather as a consequence of the bloodvessel ruptures due to the leukocytic infiltration of their walls (by rhexis). Of course, I do not believe that our opinion regarding the leukocytic accumulations in the retina in leukæmia could be applied generally. We can at least, however, assume with Meller[16] that a true tumor may in leukæmia be found in the retina.

Unfortunately, I had no occasion to examine my case before death ophthalmoscopically. Yet we may assume that the leukocytic accumulations in the retina here described could be seen clinically with the ophthalmoscope without doubt as white spots. The perivascular lymphocytic aggregation takes, as stated above, its origin almost always from the adventitia. The retinal vessels, especially the veins and capillaries, are then surrounded mantle-like and are undoubtedly seen with the ophthalmoscope as white sheaths, as they have been repeatedly described in leukæmia by a number of authors (Becker,[2] Roth,[19] Tilleaux,[20] Deutschmann,[4] Gowers,[8] Bondi,[3] Grunert,[9] and others). From the foregoing I believe that in most cases this is to be considered as a leukæmic newformation in the retina.

I might in conclusion add that the choroid in this case was also pervaded by large quantities of medium-sized lymphocytes in a tumor-like manner. I refrain from a further discussion of this since I have spoken of the lymphoma formation in the choroid in my previous paper.[11] Yet I like to emphasize again that we find very frequently in lymphatic leukæmia such lymphoma formations, as Lazarus,[12] Meller[16] and Koyanagi[11] have stated, while in myelogenous leukæmia this has been very rarely reported. Further examinations are desirable as to the relation between lymphoma formation in the choroid and retina and as to the forms of leukæmia in which they occur.

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SOCIETY PROCEEDINGS.

THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

Report of the Fifty-third Annual Meeting,
Held at Hot Springs, Va., May 29, 30, 1917.

By Miss L. Gay, Philadelphia, Pa.

Dr. Peter A. Callan in the Chair.

Heterochromia Iridis, Heterochromic Cyclitis, and Allied Conditions—Dr. E. C. Ellett, Memphis, Tenn.

Heterochromia iridis is a condition in which the iris of one eye differs in color from that of the other. It is very rare, usually occurring in brunettes; and it is most often noticed first in early life or at birth. It may be either congenital or pathological. Either no pigmentation was ever present in one eye, or it was present and is lost through some pathologic process. Heterochromic cyclitis results in cataract and glaucoma simplex. Under allied conditions cases were included that do not properly belong here, but were considered because there is a difficulty in the differential diagnosis. The most important of these allied conditions is glaucoma following uveitis. Some of the difficulties in diagnosis were illustrated by the histories of three cases of heterochromic cyclitis, two cases of heterochromic iritis with cataract, two of heterochromic iritis with glaucoma, and five of uveitis with glaucoma.

DISCUSSION.

Dr. Edward Jackson, Denver, Colo.: A case of uveitis involving the iris is attended, if it is severe enough, with a permanent change in the color of the iris. With reference to the causation, if the sympathetic nervous system takes a share in the ætiology, it is probable that the ciliary ganglion is an important seat of the lesion.

Dr. Arnold Knapp, New York City: The changes which are most important in this class of cases are not only the change in the color of the iris, but also the absence of uveal pigment in these irides. If you examine a cataract in a nephritic person, you will be struck by the absence of uveal tissue, and the margin of the iris will be faintly gray, with slight notches. In practically

all our cases, the patients have reacted to the tuberculin test; and in a large number, they have done well with tuberculin therapy.

Two Cases of Congenital Iris Coloboma.—Dr. Charles E. G. Shannon, Philadelphia, Pa.

Two sisters were admitted to the Jefferson Hospital, the older girl having a double advancement performed for squint. In the father of these girls, the right eye was normal, but the left had very poor sight. The iris revealed a partial coloboma, and the field showed a defect for white and colors, corresponding to the coloboma. There were five children in the family, and their eyes were all defective, except in the youngest child, whose eyes presented no defects. Similar defects existed in the eyes of the father's brothers, but no evidence of ocular defects existed in the mother's family. These cases are presented because of the extremely interesting family history, and for the purpose of corroborating the contention of de Beck, Arlt, and others, of the hereditary influence in iris coloboma; and the part played by sex, material shock, and a vicious prenatal environment in the causation of the defect.

DISCUSSION.

Dr. J. A. White, Richmond, Va.: A similar patient consulted me, and I found that there were five or six cases in the family with some eye defects. The grandmother of the patient had cataracts, the mother had a coloboma of the iris, and none of her mother's children has any iris whatever. In all, there are slight opacities of the lens; and in several, severe ectopia of the lens. It would be difficult to get a family showing better the influence of heredity in these congenital defects of the iris.

Dr. Lucien Howe, Buffalo, N. Y.: We know, that in hæmophilia and night-blindness, the defect follows the line of the female sex. In certain instances the defect jumps over a generation.

Dr. G. Oram Ring, Philadelphia, Pa.: A year ago, I exhibited a mother and child. The mother showed a pronounced notching of the pupil below and in one eye, and a perfectly definite coloboma in the other. Her second child, who had died a month before the exhibition of these two cases, had shown a precisely similar appearance. The third child, exhibited a definite notching in each iris, but no coloboma. In all three cases, the lens was

involved in about a similar way. After four discissions the lens was still hard, and there was an opening of not more than 4 mm. half way through the lens.

The Removal of Foreign Bodies from Within the Eyeball and Orbit. Report of Cases.—Dunbar Roy, M.D., Atlanta, Ga.

There is no diversity of opinion as to the seriousness of eye injuries due to the entrance of foreign bodies in the eye. The question of most interest centers in what operative procedure gives the best results, whether the foreign bodies be magnetic or non-magnetic. The writer's record shows 25 cases of perforation of the eyeball by foreign bodies, lodged either in the ball itself or in the orbital cavity. Five cases here reported with skiagraphs were of unusual interest.

Case I.—The left eye was lost several years ago. In October, 1913, the right eye was struck by a small sliver of steel. It was cut entirely across the cornea, and a particle was removed from the posterior chamber with a hand magnet. Final result, after three operations and four months' treatment, with correction, =20/70.

Case II.—Injury September, 1913, by a particle of brass striking the left eye. The cornea was cut and the particle had dropped down to the periphery of the anterior chamber. Finally it was extracted by stretching of the iris and the use of forceps. The final vision =20/40. The point of interest in this case was the method of removal by stretching the iris and bringing the foreign body into view.

Case III.—An injury of the left eye by a small birdshot. No contusion or laceration was seen. Vision=0. Pupil dilated under atropin. The shot was found embedded in the sclera, with one-half protruding into the posterior chamber. Final result, enucleation.

Case IV.—November, 1915, the right eye was struck by a particle of steel at the sclero-corneal junction. A radiograph showed the particle in the orbit. The eye healed with fairly useful vision. This was a case of double perforation.

Case V.—January, 1915, injury of the left eye by a shot from an air-gun. The X-ray showed the foreign body posteriorly to the inner side of the ball. Operation under cocain. The internal rectus cut. The shot extracted between conjunctiva and sclera. Result =20/40.

DISCUSSION.

Dr. T. Y. Sutphen, Newark, N. J.: I had a patient in whom the foreign body had entered the vitreous body through the cornea, iris and lens. It was impossible to see the direction of the foreign body, but the magnet brought it against the cornea. The foreign body was then easily caused to slip through the wound without injury to the eyeball. In another case, a tiny piece of steel had gone through the eyeball between the nasal pole and the equator. There was a globule of air in the vitreous body. When the opening in the sclerotic was enlarged and the magnet introduced into the vitreous chamber, the foreign body came out, and nothing more was seen of the globule of air.

Dr. Allen Greenwood, Boston, Mass.: There are about ten per cent. of the men who come to the base hospitals that have some eye complications; and the majority are either shrapnel wounds of the orbit or of the eye itself. The question of leaving a piece of shrapnel in the orbit is rather complicated in war work, because of the almost certain infection. I saw, last summer, five cases of gas gangrene of the orbit with one death. There is an immense amount of work for the giant magnet, the hand magnet, and the X-ray in localizing injuries in the eye and in the orbit. In one case of every four the substance is not magnetic, being aluminum, brass, or some alloy not subject to the action of the magnet. I use the hand magnet, because in No. 22 we do not have a giant magnet. I had a hand magnet, and removed a number of pieces from the vitreous body, after localization with the X-ray.

Dr. David Harrower, Worcester, Mass.: The small magnet has, I think, proved much more efficient than the large in most cases. When the foreign body is deep in the vitreous body, instead of trying to draw it with the large magnet, I make the opening in the sclera, as near the foreign body as possible, always in the antero-posterior direction; and, taking the flat point of the magnet, I insert it into the wound, and as near the foreign body as possible. Getting the point in, in that way, the foreign body catches on the point. When I bring the magnet to the wound, I turn it at right angles and find it easier to get the foreign body out in that way.

Dr. E. C. Ellett, Memphis, Tenn.: We should bear in mind the difficulty that the average X-ray operator has in making an accurate localization of foreign bodies. I had that forcibly brought to my attention by a case in which a small boy had been

shot with an air-gun shooting a big bullet. The pupil reacted, the anterior chamber was apparently normal in depth, and the vision did not seem to indicate that there was a foreign body in the eye. I had him X-rayed, and they brought me a chart showing the foreign body in the eyeball. There was contusion and swelling. I thought I would look again into the wound of entrance. Forcibly depressing the lower lid, the shot rolled out from the lid. The X-ray had indicated something very serious, but it was simple.

Dr. F. M. Wilson, Bridgeport, Conn.: I much prefer the large magnet. After I have the foreign body in the lower part of the anterior chamber, I make an incision in the upper part. I think that it is a much better surgical procedure to use the large magnet and control the foreign body, bring it to the wound and get it out, than to introduce the tip of the small magnet.

Dr. W. H. Wilder, Chicago, Ill.: I devised a speculum with two blades and little hooks on the end and made of non-magnetic material. In using this instrument, one can control the sclera and thus keep so many hands from obstructing the field of operation.

Dr. J. W. Charles, St. Louis, Mo.: It might be a good thing to use the ophthalmoscope if we could not get the foreign body out with forceps.

Dr. Geo. E. deSchwenitz, Philadelphia, Pa.: A man, a mason, working in granite, was brought to my clinic. A fragment of the stone had penetrated the corneoscleral junction. I made an opening with the keratome through the sclera. I tried to get the fragment with forceps and failed. I then made a small iridectomy. The iris came, but the stone remained. It then lay on the capsule of the lens. I got a piece of platinum wire and made a loop of it, introduced some physiological salt solution and slipped this wire through the opening, and the little stone floated in the wound, so that I could draw it out with the wire loop. The condition cleared up, and the man has normal vision.

Dr. R. G. Reese, New York City: I had a patient who had a piece of copper in the vitreous body. The lens was apparently clear, except the upper portion; and the foreign body could be seen floating in the vitreus. I extracted the lens, and two or three weeks later, brought the foreign body into the anterior chamber, by putting the patient in the prone position. I got under the operating table, took a knife-needle and entered the anterior chamber. Then I turned the patient over, made an

opening at the corneoscleral junction, and removed the foreign body. He recovered with 20/30 vision. I prefer removing the foreign body through the suspensory ligament into the anterior chamber, but this depends upon the size of the foreign body. I prefer the giant magnet to the small one, because I have not been able to coax a foreign body into the anterior chamber from the vitreus with the small one. After extraction, I push the scleral triangle back; and when it comes into position, it will close up this portion; and when the conjunctiva is placed over it, it will hold it in coaptation.

Dr. William H. Wilmer, Washington, D. C.: We are sometimes confronted with cases of long standing, the foreign body having been in the eye for one or may be two years. These are the cases that are the most puzzling. In a recent case it is immaterial whether the posterior or the anterior route is taken. A case that I saw a few days ago presented a few dots in the lens, and the X-ray showed a non-magnetic particle imbedded in the sclera. As the patient's eye is perfectly quiet, and the vitreous body clear, the lens not increasing in opacity, and the foreign body incased in fibrous tissue, it is hard to decide what to do.

Dr. John E. Weeks, New York City, N. Y.: We should use the magnet that will produce the least traumatism. I prefer the giant magnet in many cases; because it is absolutely unnecessary to enter the vitreus. The opening is made in the sclera, in a suitable position. My plan is to make a shallow T-shaped opening. Then, as soon as the point of the magnet comes to the sclera, if the foreign body engages, these two flaps separate, and the foreign body comes out without trouble. Closing the tissue over it, causes the wound to close without the loss of any vitreous body. In all the cases in which the foreign body is small and smooth and can be drawn through the wound, I attempt to draw it into the anterior chamber; but when it is jagged, though small, or when it is large, I prefer to make an opening in the sclera.

Dr. W. E. Lambert, New York City: When the body is small and can be drawn forward into the anterior chamber, it is preferable to extract it by the anterior route. If the bodies are large and jagged, however, I think that it is best to extract them posteriorly, through the vitreus, making the incision with a triangular flap in the sclera, and with another triangle, reversing the base in the conjunctiva.

Dr. Wm. M. Sweet, Philadelphia, Pa.: When foreign bodies are in the anterior chamber, I never open the chamber until I

have the foreign body in the position that I desire. If it is in the iris, you can often disengage it without opening the chamber. If it is not in a good position I draw it around to the upper portion before making an incision; and in many cases when it is in the lens, by a small hand magnet, I can draw it up to the upper portion of the anterior chamber before using a keratome. If you do not do this, the chances are that a large portion of the iris will be drawn out with the foreign body.

Dr. Wm. Zentmayer, Philadelphia, Pa.: I saw a case in which, the foreign body had been localized at the junction of the optic nerve with the sclera, outside the eyeball. There were profuse hæmorrhages throughout the retina, and the case was of some days' standing. It was impossible to see which spot showed the position of the foreign body. When the case is recent, and the foreign body is small, I prefer to use the giant magnet, and approach the patient to the magnet, rather than approach the magnet to the patient.

Dr. Samuel D. Risley, Philadelphia, Pa.: I object to the use of the large magnet, particularly when the foreign body is not an extremely small one. If the foreign bodies are situated in the choroid or retina and have been present long enough to excite inflammatory changes, the endeavor to bring the body forward into the anterior chamber with the large magnet is very much more likely to produce detachment of the retina than though a scleral puncture had been made, and the foreign body taken out was through the scleral puncture. I should like also to insist on the wisdom of a meridional incision in the sclera, rather than any other form of incision. My own practice is to take the little conical tip of the small magnet and place it at the puncture in the sclera, and then wait patiently for the foreign body to come.

Dr. Peter A. Callan, New York City: My preference has been, if we use the large magnet, to bring a suitable foreign body into the anterior chamber, and not make the incision into the anterior chamber until the foreign body was located under the point at which the incision was to be made; then to make the incision directly over the foreign body and extract it.

Treatment of Detachment of the Retina, with Special Reference to Müller's Resection of the Sclera.—Dr. Erwin Török, New York City.

The ætiology of detachment of the retina is still unknown The treatment of the condition is mostly symptomatic. The re-

sults of all operations recommended have been very unsatisfactory. Spontaneous reattachment has occurred in as large a percentage of cases as has a cure following an operation.

The cases may be classified in two main groups: one, in which there is a disproportion between the contents of the eyeball and its coats; and the other, in which this disproportion does not exist. To the former group belong the cases in which the cause is a shrinking of the vitreus, and those in which the extension of the sclera is the underlying cause—as in high myopia. To the second group belong the cases in which the detachment is due to a choroidal exudate, hæmorrhage, tumor, tubercle or transudate.

I have operated by the Müller resection of the sclera in twelve cases, in the first six of which I had no permanent results. The detachment in each of these cases was much smaller after the operation, or disappeared entirely; but it reappeared later. I attribute this to lack of technique and to the fact that I excised only a very small piece of the sclera. As I later increased the size of the excised scleral flap, the results were better and more promising.

The idea of the operation is to relieve the disproportion existing, by relieving the tension of the choroid, so that it may come closer to the sclera; thus preventing the formation of an exudate between them and giving a better blood supply. The reaction following this operation is very slight.

DISCUSSION.

Dr. David Harrower, Worcester, Mass.: I have done a great many of these operations, and the results have been unsatisfactory in all. In only one of them was the result at all promising; but, unfortunately, the improvement did not remain. I had a rather remarkable case of spontaneous reattachment, after I had considered the case as hopeless.

Dr. W. R. Parker, Detroit, Mich,: Detachment of the retina is purely a symptom, and not a disease entity; and we shall require much more experience than we have had in the present operations before we can know whether we are on the right track or not.

(*Concluded in August number.*)

ABSTRACTS FROM MEDICAL LITERATURE.

By W. F. Hardy, M.D.,

St. Louis, Mo.

SOME INTERESTING CONDITIONS SEEN IN THE EYE OF A NEGRO.

To obtain authoritative statements as to the conditions affect-the negro's eye, his immunity to certain diseases, his susceptibility to others, is of great interest. Kollock, of Charleston, because of the geographical situation of his city, is able to do so and has written on the subject in the *Southern Medical Journal*, April, 1917. His observations cover more than thirty years and have convinced him that the negro has deteriorated ocularly since he became free, due to (1) syphilitic infection, (2) lack of proper food and clothing, (3) bad hygiene, (4) mixture with low whites, the mulatto offspring inheriting the weakness of both races, especially tuberculosis and syphilis; (5) education implanted on a bad foundation has produced such ill effects as myopia.

Kollock agrees with Bruns and Minor in that for some unexplained reason the negro is less liable to catarrhal purulent and chronic inflammations of the conjunctiva than is the white. While some deny the occurrence of trachoma in negroes it does sometimes occur sporadically, but never in epidemic form. The figures of Bruns are quoted showing that *the* disease of the conjunctiva to which the negro is pre-eminently liable is phlyctenular conjunctivitis. Corneal affections are not more common in the negro than the white, but the results are more disastrous in that leucomata, nebulæ and maculæ are of very frequent occurrence. As would be expected, distorted pupils, due to iris prolapse, anterior and posterior synechiæ, occluded pupils and consecutive cataracts are common. A review of a Charleston clinic service for ten years showed that 37 per cent. of all the eye affections in the eye of the negro were of the cornea. The incidence of cataract and glaucoma is said to be the same in negro and white. (Other southern observers think that chronic simple glaucoma is uncommonly frequent in the negro and is made worse by iridectomy.) Cataract patients seen by Kollock were mostly uneducated and this, he thinks, tends to contradict the view that one of the causes of cataract is eye strain due to

errors of refraction. Optic atrophy in the negro is common and increasing, due most probably to syphilis and bad whisky, a component part of which is often wood alcohol. Tobacco amblyopia is equal in the two races, but rather frequent among negro women who smoke plug tobacco in pipes. An interesting condition seen almost exclusively in negroes of pure blood is night blindness. It frequently occurs with xerosis and keratomalacia, and ends in death. It is seen oftener in children than in adults. No satisfactory explanation has been given as to the cause.

Errors of refraction are not as common in negroes as in whites, and this is especially true of pure blooded negroes. Refractive errors are commoner in negro women than in men. Most refractive errors are low grade hyperopia, some few are of high degree. Myopia is much less frequent. For years Kollock did not see a myopia case in the pure blooded negro. In 1890 he reported an unusual case of a myopia of 24D. in a pure negro woman. Myopic cases among mulattoes are fairly common. Where errors of refraction are uncommon muscular anomalies are rare; such is the case with the black. Swan Burnett considered strabismus of great rarity among negroes, and Kollock has seen but one case of uncomplicated strabismus in a pure negro, report of the eye of the negro in 1892. Since then the eye of the pure blooded negro has not changed with one exception, and that is that myopia is very gradually increasing. In discussion Calhoun, of Atlanta, referred to the great prevalence of spring catarrh in the negro seen in his clinical practice.

STUDIES OF EYE GROUND CHANGES IN CEREBRAL SPASTIC PARALYSIS.

Kearney, of New York, states that certain changes are so often observable in the eye grounds of children who exhibit spastic conditions traceable to intracranial hæmorrhage at birth that the picture is characteristic. A most important sign, differentiating operable from those cases of a different nature, consists of the changes visible in the fundus of the eye which may be attributed to abnormal increase in the pressure of the cerebrospinal fluid. The following is the usual appearance of the eye grounds: "The entire fundus it generally slightly hazy and presents the appearance of particles of finely ground black pepper shaken lightly upon it; the color without the disc is changed from the normal

orange red to red; the temporal portion of the disc is paler than normal and its margins are plainly visible; there is an increased redness of the nasal portion and a slight blurring of its margins; the upper and lower margins near where the retinal vessels pierce the disc are blurred also; the veins are distended slightly out of proportion to the calibre of the arteries and the light streaks in all of the vessels are either missing or barely visible."

Some few show post-neuritic signs, viz.: pallor of disc, blurred margins, light streaks of exudate along vessels and leveling of the physiological cup. The fundus picture of newborn infants differs from that seen in advanced spastics as one would expect. In infants a papillœdema would be anticipated. Such was found by Kearney in a two weeks old infant in which an instrumental subdural hæmorrhage occurred. In eighty cases of spastic paralysis coming to operation the dura was found tense, whitish, opaque and thicker, the cortex œdematous and under increased pressure. Pressure of the cerebrospinal fluid obtained by lumbar puncture was found high in the majority of cases. Late cases show retrogressive eye changes. Every case, Kearney says, exhibits changes in the eye grounds either of recent or regressive œdema attributable to varying degrees of intracranial pressure. He concludes that every child after difficult or instrumental delivery should have the eye grounds examined. If pressure signs are found confirmed by lumbar puncture, a decompression operation should be done as soon as possible, which would lessen greatly the lamentable condition which results from neglect of this procedure.

RETINAL MANIFESTATIONS OF CHRONIC BRIGHT'S DISEASE.

Vandegrift (*Medical Record,* May 26, 1917) states that it is common to divide nephritis into two broad groups: in the first albuminuria and dropsy are distinctive with arteriosclerosis a secondary symptom, and the second, in which dropsy is inconspicuous but arteriosclerosis is the predominant factor. In studying retinal changes we distinctly find two conditions, one in which exudation into the retina is prominent, and the other in which arteriosclerosis is paramount and retinal exudation is slight or absent. The condition of the retina in the first is one of œdema of the nerve fiber, nuclear and anterior reticular layers, more conspicuous near the nerve head. This exudation of serum is

similar to dropsy in other parts of the body. There is no productive inflammation in the retinual tissue and no degeneration except in advanced cases. Secondarily there may occur a sclerosis of the vessels which as a rule is not extensive. Mention is made that star figure is in no sense pathognomonic of renal disease occurring in a number of other conditions. In the second type those changes found with chronic productive nephritis are more difficult of interpretation. For instance, it is hard to say whether or not the retinal signs are those of nephritis or of arteriosclerosis. To simplify things Vandergrift confines his discussion to arteriosclerosis as manifested in the retina. Early signs of arteriosclerosis are of the greatest importance and most difficult to interpret. The prognosis in exudative retinal manifestations is very bad, that of retinal sclerosis better, being dependent on how early the disease is recognized. The early signs of retinal arteriosclerosis have been established definitely as follows. (1) Small white spots at the macula together with small glistening spots scattered about the retina. These tend to disappear with a lowering of arterial tension. (2) A corkscrew appearance of the terminal arteries about the macula often attended by œdema of the fovea and of the nerve head. (3) Flattening of the veins (strapping) where crossed by an artery. The light streak of the arteries may be slightly widened.

As the fibrosis increases the peripheral twigs of the retinal vessels become tortuous, veins flatter, light streak in arteries more pronounced. Periarteritis and vascular obliteration are still later changes. Among the final complications are mentioned, spasm of the arteries, optic atrophy, embolism of the central artery or vein and flame shaped hæmorrhages. Arterial spasm is a forerunner of endarteritis obliterans. This arterial obliteration may lead to optic atrophy. This is not to be confused with atrophy resulting from embolus of the central artery. The blood pressure is always high. Embolism either of the artery or vein are serious import, for frequently it is a forerunner of cerebral complications.

Vandergrift believes the flame shaped hemorrhages to be a symptom of a severe toxæmic condition of the blood. He thinks they are due more to chemical changes in the blood than to changes in the vessel walls. In addition to their prognostic value they are an index to the efficacy of treatment. The author emphasis two points: (1) That the phase of the retinal manifestation furnishes an index to the clinical type of the renal disease. (2) That early and frequent ophthalmoscopic examin-

ations in the course of renal or arterial disease are of inestimable diagnostic and prognostic value in the determination not only of the condition of the kidneys but also of the general circulation.

PENETRATING WOUNDS OF THE OCULAR GLOBE; THEIR TREATMENT IN THE ARMY.

Bourdier (*Presse Méd.*, 1916, p. 522) says that the percentage of eye lesions as compared with the general percentage of the wounded has become considerably increased with the progress of the war. From 1 to 1.5 per cent. they have increased to 5.7 per cent. with trench warfare. Penetrating globe wounds, next to contusions, are the most frequent—174 perforations for 633 ocular lesions observed, about 26 per cent. According to Genet's statistics, 6 per cent. of ocular wounded lose both eyes; in 15.8 per cent the eye is struck. Petit estimates that it is possible to preserve the globe in 26 to 74 per cent. of the cases, according to the condition in which it is found. The statistics of the first months of the war do not show any better results. On the contrary, from March, 1916, to September, 1916, among 174 globe penetrations the author has noted 93 cases in which the globe has been preserved, and 23 cases in which the vision has been partially preserved. Late prognosis appears to be more favorable now than in preceding wars. Cosnetatos in his account of the Greco-Turko-Bulgarian war, in 118 cases, reported 29 complete destructions of the eyes and 17 unilateral destructions. Sympathetic ophthalmia seems to be less manifest now than formerly.—Abstract, in *Surg., Gyn. and Obst.*, May, 1917.

BOOK REVIEW.

GLAUCOMA, A HANDBOOK FOR THE GENERAL PRACTITIONER. By Robert Henry Elliot. New York: Paul B. Hoeber, 1917.

This little monograph, gracefully dedicated to Sidney Stephenson, gives a concise report on Elliot's views on glaucoma and the operation of trephining bearing his name. While there seems not much in it that is new to the reading specialist, it cannot fail to prove of decided value to the general practitioner who wants to inform himself quickly on the newer phases of this interesting subject. It is well illustrated. ALT.